A Newsletter of the Local Technical Assistance Program (LTAP)

T2 Bulletin

Issue 59, Summer 1998

T2 Helps You Save Time, Save Hassles, Save Postage

By Laurel Gray, NWT2 Technical Assistant

The T2 Center staff is excited and pleased to announce the availability of on-line registration for T2 training classes. As more and more local agency public works departments get themselves on-line, we in T2 want to make registering for our classes even easier and quicker than it already is.

In the past, registrations have been accepted by mail, over the phone, but mostly by fax. Now we've added the speed and ease of the Internet to browse, select, and immediately register for the courses you want. As you browse through our T2 Internet training site on the Web located at

http://www.wsdot.wa.gov/TA/T2/train.htm

Click on any class title highlighted in blue that you are interested in...and Voila!...a registration form appears, ready for you to fill out. Simply fill in the registration information on the screen then click the "Send" button at the bottom of the page. Instantly your registration is e-mailed to the T2 center for processing. It's that easy. No envelope, no postage, no phone-tag, and no hassles with the fax machine.

Not only that, we will soon have maps and area motels linked for direct access to location information and hotel reservations. You will be able to print a map to the training location and cruise through several motel home pages to get current rates, directions, and make your overnight accommodations.

We hope that you'll take a few minutes to familiarize yourself with this new service. And we encourage you to send us an e-mail and tell us how you like it. We want to make it as easy as possible for you. So give us your ideas on how to improve our service. You can contact me at:

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The Northwest Technology Transfer Center
TransAid-WSDOT

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Wealth of Superpave Information Presented at Conference

By Karen Haas Smith

"We cannot expect the technology of the World War II era to meet the demands of our nation today," said Federal Highway Administrator Kenneth Wykle, keynote speaker at the '*Superpave: Today and Tomorrow*' conference April 21-23 in St. Louis. "In the past 10 years alone, traffic volume in this country has doubled and pavement loading have quadrupled."

The latest news on trends and technology related to Superpave, the high-performance asphalt pavement mix design system, were reported at the conference, sponsored jointly by the Asphalt Institute and the Federal Highway Administration (FHWA).

> *"Working together, we can have better pavements."*

"Working together, we can have better pavements," Wykle continued. "That means using the best technology and providing training to understand the need for proper mixing, proper temperature when applying to avoid tender zones, proper compaction, sensitivity to weather conditions, prevention of bleeding, rutting, cracking. It also means knowing the specifications and staying within tolerances. Quality is *Job One* with Superpave."

The number of Superpave projects has skyrocketed to 1,339 this coming construction season, which will represent 30 percent of awarded asphalt tonnage and about 16 percent of state asphalt paving programs, compared to just 93 projects representing 2 percent of the market in 1996. Three-quarters of the states plan to implement the Superpave mix design system by 2000, and all but four states will have implemented the Superpave binder specification by then.

Compaction

Some of the most valuable and timely information exchanged at the conference related to field construction. Superpave mixes can require a greater level of compactive effort. The key words are: "attention to detail," said rollers, higher frequencies (vibrations per minute) and lower amplitudes work better, Deahl said. He recommended using a vibratory read tachometer. Sines, who is Supervisor of New York's Field Engineering Unit, recommended running "team" breakdown rollers, using two vibratory compactors on the mix while it is still very hot to get as many passes as possible while monitoring the mat temperature.

"The trend toward bigger heavier rollers with the Superpave system can damage pavement structure on smaller roads," Sines said. "A large part of our system in New York State is rural roads, and we are wanting to design some finer Superpave mixes for lower-volume roads."

The "Tender Zone"

The mysterious "tender zone" — a temperature zone (generally reported between 200 to 240 degrees F) where some mixes become unstable — was much discussed. "It's not in all the mixes. Sometimes it's not there in the morning, and shows up in the afternoon. We don't know what causes it," Sines said. The tender zone phenomenon seems to be related to ambient temperatures as well, and in some areas of the country it has not been a problem at all. About two-thirds of those responding to the NAPA survey reported some tenderness in the mix. Recommended procedures are to either avoid compaction altogether when the mat temperature reaches those temperatures if tenderness is observed, resuming compaction after the mat cools; or to use a rubber-tired roller, with proper confinement of the mix, for rolling in the tender zone. "Each roller operator needs to understand what temperature zones he should be rolling in," Sines said.

RAP

Use of RAP (recycled asphalt pavement) in Superpave is becoming more commonplace, with ongoing research aimed at delivering more knowledge of how recycled materials may affect binder properties.

"Contractors who aren't successful with RAP just dump it in. If you do that you can't use very much of it," said Richard Schreck of the Virginia Asphalt Pavement Association. "If you test it, characterize its properties and treat it like any other material, you can use a lot more of it." About one-half of Virginia Superpave projects use RAP.

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Current guidelines on use of RAP in Superpave, issued by the FHWA's Mixture Expert Task Group in March 1997, call for a three-tiered approach. Aged materials can be stiff and cause cracking. At low levels of RAP use, there is no recommended change to the binder grade. At medium levels, the binder grade is reduced by one level. At high levels, further analysis is required based on "blending charts." Current guidelines are based on empirical experience. Research being conducted at the North Central Superpave Center is aimed at producing improved guidelines based on improved analytical understanding sometime next year.

Permeability

Permeability problems have emerged on some Superpave projects as well, most notably in northwest Florida where the available aggregates make mixes more susceptible to this problem. Recommended solutions include high in-place densities with strict density monitoring specifications, well-sealed longitudinal joints, and thicker lifts. Florida now uses a 4:1 ratio between lift thickness and maximum aggregate size. Standard Marshall recommendations call for a 3:1 ratio.

Superpave's impact on the aggregate industry was discussed by several speakers, including industry spokespersons who pointed out that new equipment and procedures are required, placing a capital investment burden on many suppliers. Don Green of United Metro Materials in Arizona described how his firm successfully geared up for Superpave, changing equipment and processes to accommodate the demand for higher quality, more uniformly graded aggregates.

> *"We love the mix. It's the prettiest mix we've ever run."*

Lawrence Warren, a Mississippi contractor and the current NAPA President, said, "We love the mix. It's the prettiest mix we've ever run. There are no more Marshall hammers in the state that invented them. Mississippi is 100 percent Superpave." He called for a "renewed commitment to training to enable the contracting industry to deal with new specifications, materials, and equipment."

Uniformity of the application of the Superpave specifications remains a much-debated issue, with some states and contractors calling for modification of the system to allow greater use of local materials. AASHTO Lead States Superpave Team Leader Paul Mack of New York State encouraged states to comply with the AASHTO Superpave specifications and to work through the AASHTO standards process to achieve consensus on any future specifications changes.

> *"Superpave is a system just like your car is a system. If you go out to your auto and start taking parts out of it, pretty soon it's not a system any more, but a pile of parts."*

"Superpave is a system just like your car is a system. If you go out to your auto and start taking parts out of it, pretty soon it's not a system any more, but a pile of parts," Mack said. "Superpave can be improved, and research is underway that will improve it. But in the meantime, to the extent your state follows specifications you will be in a position to immediately implement future improvements."

"We are committed to assisting the states with new technology but the states must decide when and how to use the technology," FHWA Administrator Wykel said. ". . . FHWA is committed to work with the industry and the states to provide the best pavement technologies available in the world."

For more information on Superpave construction issues, readers may wish to consult a new report, *Superpave Construction Guidelines*, published by the National Asphalt Pavement Association (NAPA) under a cooperative agreement with FHWA. The report, available from NAPA and Cathy Nicholas of the FHWA Washington Division, points out the differences between Superpave mixes and conventional mixes and provides tips on how to prevent these differences from disrupting mix production and pavement construction.

At the NWPMA Fall Conference in Portland in October there will be a session on Superpave. This article gives a good idea on the direction state DOTs are taking in Superpave. It is anticipated that local agencies will using Superpave on a majority of projects in the coming future.

Karen Haas Smith is a communications consultant in Rockville, Maryland who provides ongoing support to the FHWA Superpave Technology Delivery Team.•

T^2 Promotes Travel on the Information Super Highway

Roger Chappell, NWT2 Technology Integration Specialist

TransAid's T^2 center sponsored the first meeting of the Web Technologies Interest Group. The purpose of the group is to network local agency and state individuals who share a common interest in Internet Web development and applications technologies. The group is made up of representatives from counties, cities, and other agencies including various departments within WSDOT.

Several interesting presentations were made at this, the inaugural session. Clint Kaku of WSDOT MIS presented a live Web demonstration on Internet Map Serving Technology. He showed how, from your desk top, you are able to pull up WSDOT's mapping products and combine your own tabular data with maps in order to produce GIS-type mapping products. This technology is new to WSDOT and is currently in the evaluation stage. Many in the group expressed strong interest in the possibilities Internet desktop mapping has to offer. For more information on this project, phone Clint at (360) 753-7790, or e-mail KakuC@wsdot.wa.gov.

Gene Ryser, of County Road Administration Board (CRAB), joined Clint's presentation. Through the live Web link used in Clint's presentation, Gene was able to show what Thurston County has done using Internet Map Serving Technology. Thurston County has done a great job of applying this technology. Gene was able to pull up a county map, zoom in to a parcel, then query the parcel for a wide variety of useful information, from cadastrel to wetland information. The Thurston County system can be found at:

http://www.crab.wa.gov/thurston/geodata

Try their create-a-map function and check it out for yourself.

If Internet Map Serving sounds like a technology that you are interested in, I would suggest that you start with your local GIS vendor. Depending on the vendor software that you have chosen to use to create your GIS, it may determine the best way for you to publish your mapping products on the Web. There is no sense in reinventing the wheel.

As with any GIS product today, each will have their own strengths and weaknesses with respect to your particular needs and what you want your Website to be. Do you want interactive mapping capabilities with the ability to query and display a variety of data, or would a static map meet your needs? There are a number of vendor URL's listed below to help get you started in your search.

The two presentations described above were done using products by ESRI (Environmental Systems Research Institute). The products were ArcView Internet Map Server and Map Objects.

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Expand Your Skills Through the

Associate of Technical Arts in Public Works

The community college system has started an Associate of Technical Arts in Public Works (ATAPW) degree program and it is now available at South Puget Sound Community College and Bates Technical College. Various career paths are available. Students can get a curriculum of courses from SPSCC, or refer to their latest catalog. Basic courses can be taken at any community college, but final course work must occur at SPSCC. Contact Jim Nichols, P.E., the program coordinator at (360) 754-7711 ext. 590.

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ESRI's Site

http://www.esri.com/

http://www.esri.com/products/arcview/ims/arcviewims.html

http://www.esri.com/base/products/mapobjectslt/mapobjectslt.html

MapInfo says they have two products that will also allow you to publish maps to the Web, Map Extreme and Map Excite.

MapInfo URL's

http://www.mapinfo.com/homepage.html

http://www.mapxtreme.com/mapxtreme/mapxtreme.html

Autodesk has a product called MapGuide.

Autodesk URL's

http://www.Autodesk.com/

http://www.Autodesk.com/products/mapguide/index.htm

The second presentation was by the WSDOT Webmaster, Wayne Szydtowski. His presentation entitled "Data Basing on the Web" demonstrated how, by using the product Cold Fusion by Allaire, WSDOT is able to add interactivity to their Web pages. Instead of being limited to only displaying static content on their Web pages, this product gives the ability to display and query a variety of tabular data, from their Web browser. If you can write HTML, Cold Fusion's CFML can provide a tool for further Web page expansion. Since documentation for Cold Fusion currently resides on a WSDOT test server, for more information contact Wayne by e-mail: WayneS@wsdot.wa.gov or phone (360) 705-7679.

You may also want to check out these Web sites:

Allaire's homepage: http://www.allaire.com/

CF Advisor homepage: http://www.cfadvisor.com/

What Is A Deicer?

by Dale Keep, Maintenance Methods Specialist, WSDOT

Deicers are generally known to be products that melt snow and ice. They all are highly soluble in water and exhibit a eutectic temperature (eutectic temperature defines the lowest temperature at which a solution can melt ice or snow) preferably several degrees lower than the ground temperature encountered in the ice or snow event. They are rated by their ice melting capacities and can be further characterized by their low temperature solubility in water. The less chemical in the solution, the higher the freezing point.

The table below shows the eutectic temperature of some common deicing chemicals at their optimum solution percentage. There are many other products on the market today besides the ones being used, for example, that display highly desirable characteristics.

Deicer Name	Eutectic Temp. °F	Conc. % at Eutectic Temp. °F
Calcim Chloride	-60	29.6
Calcium Magnesium Acetate (CMA)	-18	33.0
Magnesium Chloride	-28	21.6
Sodium Chlorid (salt)	- 6	23.8
Urea	+11	32.6

How A Deicer Works

All deicers are either endothermic (absorbs heat) or exothermic (gives off heat). Sodium chloride is endothermic; therefore, it absorbs heat from the water it makes while melting snow or ice. This lowers the temperature of the water and its freezing point. This explains why salt is used on the ice in an ice cream maker to freeze the ice cream while the salt-water solution does not freeze. The salt added to the ice melts the ice, lowers the freezing point of the water temperature, and results in a solution cold enough to freeze the ice cream. Ice alone can't freeze ice cream, and if the ice cream is not freezing, simply add more salt, absorb more heat, and lower the temperature of the solution until it does freeze. Exothermic materials such as Calcium Chloride give off heat as they melt snow and ice and the chemical mixes with water. Under certain conditions, the resulting temperature from this exothermic action can actually be very hot.

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Deicing

Regardless if the chemical being used is endothermic or exothermic, they are used in one of two ways. One way is by applying it to the ice or snow and simply melting the mass of material from the top down. This method is called deicing and is reactive by nature. Snow and ice have to have accumulated before the deicing operation can occur. Deicing operations include plowing of slush and loose material that result from the chemical action.

Anti-Icing

The second method is call anti-icing and is proactive by nature. Anti-icing is achieved by applying chemicals to the roadway before the storm event. This thin layer of chemicals between the snow or ice and the pavement greatly reduces or eliminates the bond of the snow and ice to the pavement. This is more efficient because of lesser quantities of deicers required, improved roadway conditions, and vehicle safety. Liquid deicers, if applied correctly, work well for this.

System Effectiveness

The effectiveness of a deicer and by which of the two methods it is working is easily assessed by observing changes in the material on the road suface over time. If the anti-icing process is dominant, any snow or ice will be cast from the roadway by vehicle tires or plowing to expose bare pavement, which is wet with deicer solution. This deicer solution prevented the bond to the pavement. When a chemical is used in the de-ice mode of operation, it is melting at the surface (assuming sufficient deicer is applied) the snow or ice will get wet on the surface, gradually turn to slush and brine, and penetrate down to the roadway surface spreading and breaking the bond. The snow and ice can now be plowed off or thrown off by traffic.

The deicing method of operation typically required about five times as much chemicals per given storm event than the anti-icing mode of operation and results in lesser roadway condition during the storm.

Roads properly treated ahead of the storm normally not only result in better conditions during the storm event, but get back to bare roads sooner after the storm is over. The rate at which pavement dries depends on the relative humidity, precipitation, wind, sunlight, chemistry of the deicer used, and traffic volume.•

How to Pick Anti-Icing Products

(Source: Better Roads, June 1998)

When you pick an anti-icer, you want a material that gets the job done. You also need one that operates within the likely temperature range you will face.

You need a material that works fast and is safe to the environment. You want an anti-icer that is effective and economical when total cost of use is considered.

You and your crews want a material that is easy to handle and is not an irritant and is not harmful. It should be safe to use and store.

Dale Keep and many other agency professionals use liquid magnesium chloride. However, new materials have appeared since the original Washington DOT tests were conducted and these offer great promise, as well. Dick Atkins at Washington DOT tested one of these on both higher and lower elevations, with excellent results.

Evaluations

Older anti-icing materials and deicers have been tested under Strategic Highway Research Program projects. For example, one study evaluated the scaling effects of NaCl, Cacl2, MgCl2, CMA, and deionized water on concrete surfaces. MgCl2 and CMA ranked closest to deionized water in that study. In another study, measuring product toxicity, magnesium chloride ranked better than baking soda, sodium chloride, calcium chloride, aspirin, and caffeine as to toxicity.

A more recent material made from a residue of the process for making ethanol was originally used as a cattle feed additive. Called Ice Ban, it is less corrosive than water and is the least corrosive product on the market, according to Steve Bytnar, with Minnesota Corn Processors. The material has recently been approved for use on federally funded roads. In a variation on the product, in a 50/50 mix last year, it saved $240,000 in materials alone, according to Bytnar. The product sells for $1 to $1.50, depending on shipping, he says.

In the Washington DOT test, Atkins used the material on both higher and lower elevations. With 29 years experience as a maintenance supervisor, he found that it worked better than other products.

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The Indiana DOT also tested the material for anti-icing and deicing on the bypass around South Bend.

Why Liquids

The higher concentration of liquid anti-icing and deicing chemicals offers greater melting capacity than lower concentrated products, Keep says. It is important to be sure that it does not form solids in cold temperatures because these can clog lines, tanks, and pumps.

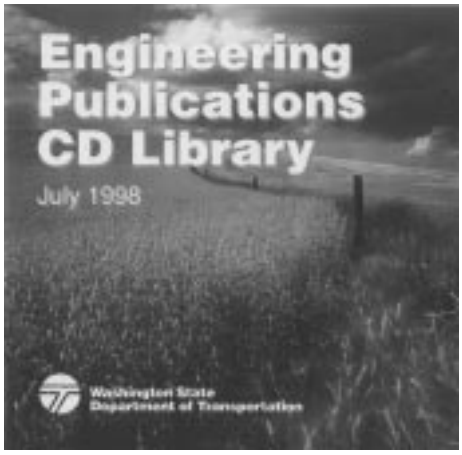
Compare the melting capacity of the same material at two concentrations, Keep says. In a storm with temperatures to 0 degrees F, a 15 percent solution with a melting point of 5 degrees F won't work. A ton of the same material, in a 30 percent solution will work until it has generated 1 t. of water from melting ice or snow and has been diluted to a 15 percent solution.

Keep has formulas that can help the winter maintenance engineer determine concentration efficiencies.

It is also critical to compare the melting capacity of different materials at various concentrations.•

Tired of Updating, Storing, and Hauling Around All Those Heavy WSDOT Manuals?

Save time, space, and money with the new WSDOT Engineering Publications CD Library on CD-ROM!



For just $15 you can receive a two-year subscription to the WSDOT Engineering Publications CD Library on compact disc, full updated, and delivered to your doorstep. That is four CDs per subscription, one every six months. The current edition includes 22 manuals and the list will continue to grow with each new edition. That is over $300 (and 40 pounds!) worth of documents.

Check these titles out! These are just a few of the manuals:

- *Local Agency Guidelines*
- *WSDOT Construction Manual*
- *WSDOT Standard Plans* (English & Metric)
- *WSDOT Standard Specifications* (English & Metric)
- *WSDOT Standard Plans*
- *WSDOT Design Manual* (selected chapters)

Need a hard copy? Print a page, a chapter, any portion of a manual, or an entire manual. You choose how much of a document and how many hard copies you need. Quality? With a good inkjet or laser printer, the copy will equal that of the purchased document — without the expense.

Not only can you print your own copy , the CD allows you to search the entire library of documents by work or topic, quickly over through documents with hypertext linking, reach multiple users via a LAN installation, AND it's multi-platform. It runs on Mac, Win 95, Win NT, and Win 3.x operating systems.

PLUS, the CD allows you to load a runtime version of Filemaker Pro along with 152 WSDOT "intelligent" forms onto your hard drive. This allows you to fill the forms out on the screen with calculated fields automatically computed, save a record of the form, and print a hard copy. An additional 14 not so "intelligent" forms are available to print and then fill in the old fashioned way — by hand.

Is $15 still too much? Want to get rid of all that paper? Have we got a deal for YOU! If you are in a Washington local agency and are willing to print your own hard copy, TransAid is willing to give you the CD FREE. All you need to do is give up your subscription to your current published version!

For more information, contact Matt Love, WSDOT Engineering Publications, at (360) 705-7430 or e-mail Matt at lovem@wsdot.wa.gov.•

Washington Agencies Blaze the GIS & GPS Technology Trails

Washington transportation agencies at both the local and state levels have aggressively pursued the development and implementation of Geographic Information and Global Positioning System (GIS & GPS) technologies. The technologies have been implemented for presentation of basic inventory information to sophisticated merging of photo imagery and global positioning information.

At the state level, the Washington State Department of Transportation has many areas of interest in GIS & GPS, here are four examples to name a few:

Ron Cihon, e-mail: CihonR@wsdot.wa.gov (360-705-5510) heads up the WSDOT GIS section and is responsible for the development and implementation of the WSDOT "dynamically segmented" base maps. The product he has developed and supports is called MADOG (Mapping And Display Of Geographic Information). It provides GIS users throughout the state the ability to relate data to a linear referencing system (LRS), such as mileposts, on a "smart" base map. Using this product, the user is also able to tie data to their smart base maps with GPS coordinates. There is a wide variety of data that can be incorporated including accident locations, pavement conditions, guard rail inventories, stripping logs, freight and goods corridors, and much more. If your data can be represented by a point or a line, this system can be used to display it on a state base map. Since this system runs in an ArcView environment, the user also has full GIS functionality.

The WSDOT has also developed a new product called SRview. SRview is a digital imaging platform. The Transportation Data Office has equipped a van, with the ability to take video footage, and digital images of the state's entire highway network. These digital images are available from any desktop PC within the department. These images are both geospatially referenced and tied to WSDOT's LRS. These digital images can also be brought into the MADOG environment, to assist in GIS analysis. The T^2 Center is currently working with Marion County, Oregon and several local agencies within Washington State, to share this technology with others. The T^2 Center has recently published a "how-to" guide to assist you in equipping your own video imaging van. The detailed guide is in color for easy referencing and is in final editing for publishing on the Internet. For more information on this product contact:

Roger Chappell at ChappeR@wsdot.wa.gov or 360-705-7539.

You can also find additional information on the Web at: http://www.wsdot.wa.gov/TA/Mgt.Systems/srat.htm

WSDOT also has a project currently in the pilot stage called ROAD, which stands for Roadway Object and Attribute Data. This project is being designed and implemented by the WSDOT Transportation Data Office, Roadway Data Section. Your contact person is Roger Chappell at ChappeR@wsdot.wa.gov or 360-705-7539.

This project utilizes a van with an on board GPS unit, integrated with a computer system, and DMI (Distance Measuring Instrument). The data gathered with this portion of the equipment is GPS data combined with LRS data, and will be used to increase the accuracy of WSDOT base maps as well as for validation of roadway inventory data. You can think of it as a van sized cartographers digitizing "puck," moving over the real life topography of the state collecting vertical and horizontal position coordinates. This van is also equipped with portable GPS equipment, a laser range finder, and a digital camera that allows the crew to inventory a wide variety of roadway features away from the van itself. The inventory data will be stored in a SQL database to facilitate query and report capabilities and integrated with GIS projects.

There is also an Internet Map Serving project being currently developed by Clint Kaku of the WSDOT Management Information Systems. Internet Map Serving gives you the ability to publish interactive GIS maps over the Web. If you would like more information on the system, you can contact Clint by phone 360-753-7790 or e-mail at KakuC@wsdot.wa.gov.

On the local agency front there are also many exciting projects taking place in Washington as well. Gene Ryser with CRAB (County Road Administration Board), e-mail gene@crab.wa.gov, 360-753-5989, recently did an impressive demonstration on Internet Map Serving Technology, for a local interest group. Through a live Web link, he was able to show what Thurston County has done using Internet Map Serving Technology. Thurston County has done a great job of applying this technology. He demonstrated how to pull up a county map, zoom

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down to a parcel, and query the parcel for a wide verity of information, from cadastrel to wetland information. CRAB's site is located at http://www.crab.wa.gov/thurston/geodata. Try their "create-a-map" function, to see it for yourself.

There was also a good article in *IT Utilities* (http://www.itforutilities.com), March/April edition, page 26. The title of the article was "Mapping from the Ground Up" and featured a project by Franklin Counties Public Utility District No. 1. In the article they covered the development of FRIS (Franklin County Regional Information System). This is a GIS incorporating digital orthophotography, GPS facilities mapping, and much more.

Here are some other local agency sites to round off this tour of GIS/GPS technology in Washington State.

Pierce County's GIS Web site
http://triton.co.pierce.wa.us/map/search_start.cfm

Snohomish County's GIS Web site
http://www.co.snohomish.wa.us/dis/gis/index.htm

Clark County's GIS Web site
http://www.co.clark.wa.us/general/assess.htm

This is just a small sample of GIS & GPS application's taking place here in Washington to give you a glimpse at some GIS/GPS technology applications taking place around our state.

Help us spread the word. If you have Web sites, success stories, tips and tricks that you feel would be helpful to others as they travel down this technology highway, please contact us. We would like to distribute what's working, or not working, to save everyone time and money. You can contact:

Roger Chappell
ChappeR@wsdot.wa.gov
360-705-7539•

Asphalt Overlays Save

Better Roads, August 1998

Overlay rehabilitation projects fall in that middle range between simple maintenance and total road reconstruction says Jay Hensley, regional engineer for the Asphalt Institute. Hensley works with 27 states, assisting with asphalt design, issues, and solutions.

A minor surface restoration with a nominal overlay of 1.5 to 2 in. is the answer when a road is structurally sound, but the surface is polished or doesn't ride well. In that case, no structural value is added to the road. The 2 in. that are milled out are replaced with another 2 in.

The most important property related to pavement performance is the volumetric sum of the asphalt content and air voids. Air voids are needed in the pavement to make the asphalt pavement an elastic material. The other component of voids in the mineral aggregate is the volume of asphalt. Sufficient asphalt coating of the mineral aggregate is essential for durability.

When asphalt layers are subject to moisture damage, or the voids have collapsed and the mix becomes plastic instead of elastic, major rehabilitation is required, involving deep milling of 3 to 5 in.

Deciding When

If a road is judged with a subjective present condition rating of 0 to 100, and falls between 80 to 100 for transverse cracks or different kinds of stress, crack pouring and other minor repairs such as patching, short restoration, fixing drainage problems, and so on, may be performed by the highway department maintenance force.

When the rating approaches 70, however, it is time for surface restoration. "We save money by bringing the surface up to good serviceability," says Hensley. "We can save from seven to eight times the amount we'd spend if the road was improved at a rating of 70. This is a situation where *a stitch in time* really is true."

> *"We can save from seven to eight times the amount we'd spend if the road was improved at a rating of 70."*

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Hensley provides the following elements of rehabilitation design to be considered prior to beginning any rehabilitation project:

- Understand project distress.
- Traffic history and projections.
- Evaluation of past materials used.
- Understanding of past construction.
- Climactic conditions.
- Subgrade characteristics and behavior.

The next step is to determine the most cost-effective rehabilitation strategy:

- Access existing distress.
- Know the cause of existing distress.
- Determine strategies to correct distress.
- Evaluate effectiveness of alternatives.
- Most cost-effective approach includes determining 1) initial cost, 2) total cost of pavement preservation in design life, and 3) the next rehabilitation necessary.

When these steps are adhered to, asphalt overlays will last 7 to 15 years, depending on traffic volume.

> *"You've got to be able to evaluate what's there and know that you're not going to be covering up anything that shouldn't be."*

New surface failure is probably not the fault of the overlay itself. "The overlay isn't inferior — it's what they put it on top of. From the layer beneath, surface distress reflects into the new surface," says Hensley. "You've got to be able to evaluate what's there and know that you're not going to be covering up anything that shouldn't be. There could be stripping due to moisture damage. Don't cover this up. Any time something can be identified as structurally unsound, it needs to be removed."

Proven to Last

The westbound lanes of Arkansas Interstate-40, on the eastern side of the state, were the first full quality control/quality assurance project for the Arkansas Highway Department. This project consisted of milling approximately 4 in. of existing HMA and replacing it with 4 in. of binder course and 1.5 in. of surface course on 32 lane mi. The original overlay of the Portland concrete cement pavement was placed in 1978 and consisted of 3.5 in. of crack relief, 4 in. of intermediate course, 1.5 in. of surface course, and an open-graded friction course. The friction course was constructed with silica gravel, which absorbed much of the asphalt, leading to loose aggregate. The resulting windshield and headlight breakage from the loose material made rehabilitation critical.

The new overlay was designed as an Arkansas high-traffic mix using a 75-blow Marshall mix design. A standard AC-30 asphalt cement was used.

This route is one of the heaviest traveled truck routes in the U.S. The current average daily traffic on this lane is 29,000, with 62 percent, 52 percent of which are heavily loaded. The project has no rutting or cracking to date after seven years of service.

> *"When you do overlays, you can get in and out quickly."*

"When you do overlays, you can get in and out quickly — rehab work can go as fast as one lane-mi./day for surface restoration only. We can also rubblize a pcc pavement and overlay a mi./day," says Hensley. "This saves delays, and helps prevent accidents."•

Very Successful Spring Road Show Season Ends

John Easley, T^2 Road Show Trainer, just completed a very aggressive and successful spring road show program. Over a four-month period, March 1 through June 30, John provided 125 on-site training sessions for 1,354 students in 126 local agencies, and he traveled 13,500 miles in the process, all this with 99 percent of the students rating the shows as good or excellent.

To help achieve these impressive numbers John has implemented a very efficient scheduling process that includes scheduling training sessions one year ahead, saving program set-up time, and allowing more time in the field with the agencies.

If you would like to schedule a Road Show, feel free to set up a session with your trainer when they visit, or contact Laurel Gray at:

Grayl@wsdot.wa.gov

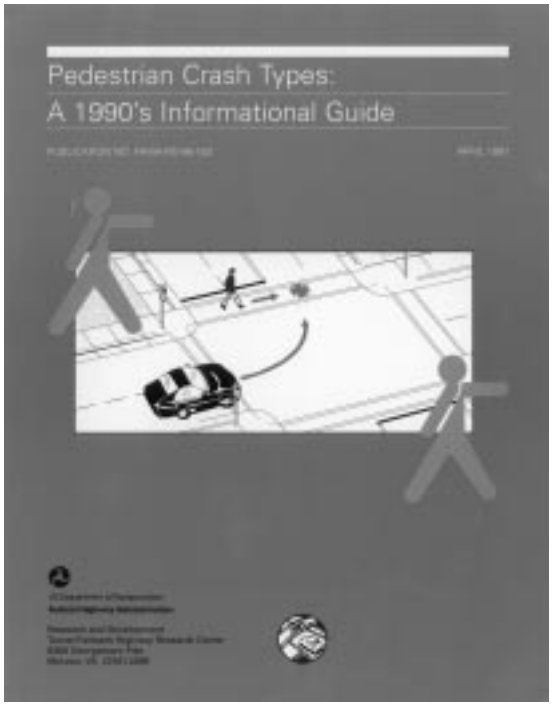
(360) 705-7386

Shedding Light on Bicycle and Pedestrian Crash Types

Source: Research and Technology Transporter, U.S. Department of Transportation, May 1998

In 1996 in the United States, 5,412 pedestrians and 761 bicyclists were killed and an estimated total of 141,000 were injured as a result of collisions with motor vehicles. Before state and local transportation engineers and planners, pedestrian/bicycle coordinators, health and education officials, and law enforcement can improve non-motorist safety, they must know how pedestrian- and bicycle-motor vehicle crashes occur. A thorough understanding of the problem can help communities develop countermeasures to lessen conflicts and resulting crashes.

Two FHWA publications, *Bicycle Crash Types: A 1990's Informational Guide* (FHWA-RD-96-104) and *Pedestrian Crash Types: A 1990's Informational Guide* (FHWA-RD-96-163), are now available. They are simple informational guides to the most frequently occurring types of bicycle- and pedestrian-motor vehicle crashes. The guides are based on detailed examinations of the actions preceding the crashes.

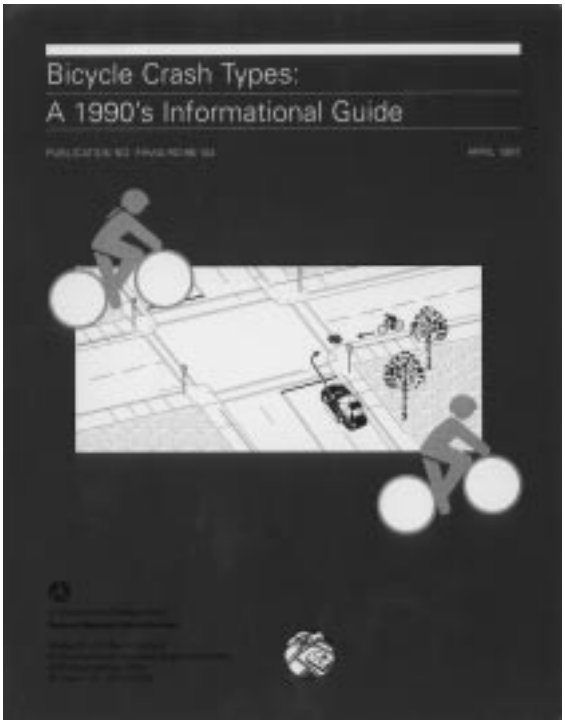


A sample of 5,000 pedestrian and 3,000 bicycle crashes was taken from California, Florida, Maryland, Minnesota, North Carolina, and Utah.

In addition, a computer program, Pedestrian and Bicycle Crash Analysis Tool (PBCAT), is currently being developed. This software will help transportation planners and engineers create a data base of pedestrian and bicycle crashes, categorize these crashes, and develop appropriate countermeasures.

Copies of these handsome, two-color publications are available from FHWA's R&T Report Center by calling (301) 577-0818 or the National Bicycle and Pedestrian Clearinghouse (202) 463-8405. Information on issues and research relating to improving pedestrian and bicyclist safety are also available on our new Web page: www.tfhrc.gov/pedbike/pedbike.htm. Check it out! •

Carol Tan Esse, (703) 285-2071,
carol.tan.esse@fhwa.dot.gov.



Pavements
Rigid Pavement Designing Goes Microsoft Excel

Source: Research and Technology Transporter, U.S. Department of Transportation, May 1998

A Microsoft Excel spreadsheet that automates the design and analysis procedures for the Long-Term Pavement Performance's (LTPP) improved guidelines for portland cement concrete (PCC) pavements is now available. Easy to use, the new software features a "Sensitivity Analysis" capability that varies a user-selected parameter while leaving all other critical inputs constant. The design parameters that can be analyzed with this feature include modulus of rupture, elastic modulus of slab or base, base thickness, k-value, joint spacing, reliability, and standard deviation.

The new spreadsheet was developed to make it easier for highway managers and engineers to implement the improved design and analysis procedures, which were developed under NCHRP research and validated with LTPP data. These procedures were adopted by AASHTO and published as a 1997 supplement to the *1993 AASHTO Guide for Design Pavement Structures.* Improvements that are included in the '97 supplement include improved k-value selection criteria, consideration of curling and warping, joint spacing design, consideration of slab/base friction, and faulting and corner break prediction.

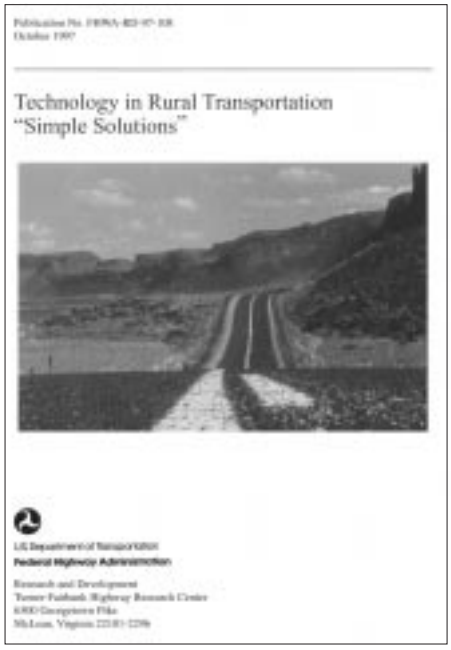
The new software is not intended to replace DARwin (the computerized version of AASHTO's '93 Guide), but rather to be used as an interim tool. It is anticipated that the improved guidelines will eventually be incorporated into DARwin or a new pavement design software that results from the AASHTO 2002 Guide. You may contact the Pavement Division for a copy of the new spreadsheet software.•

Mark Swanlund, (202) 366-1323, mark.swanlund@fhwa.dot.gov.

Technology in Rural Transportation: "Simple Solutions"

FHWA Contact: Paul Pisano, HSR-30 (703) 285-2498
Source: TechBrief, July 97, FHWA, Pub. No. FHWA-RD-97-105

The Rural ITS "Simple Solutions" Project, which was performed within the Enterprise pooled-fund study program, aimed to identify and describe proven, cost-effective, "low-tech" solutions for rural transportation-related problems or needs. These projects, referred to as "Simple Solutions," focus on practical applications of technologies that could serve as precursors to future applications of more advanced systems or intelligent transportation systems (ITS).



More than 50 solutions were initially identified and documented, and then categorized according to the seven Critical Program Areas (CPAs) defined within the U.S. Department of Transportation's Advanced Rural Transportation Systems (ARTS) Strategic Plan. Of all the projects, 14 solutions were selected to be documented and analyzed in detail (see table 1). Project selection was based on representing all of the CPAs, as well as the ability of a project to transfer to other locations.

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A report was written as part of this 6-month study that contains detailed descriptions of the 14 solutions, which include benefits of the technology; the expected implementation process; the potential issues associated with each technology; and each technology's role in a larger scale, fully integrated rural intelligent transportation system. The report also describes 42 other feasible solutions, examines broader rural ITS developments, and discusses other findings, such as transportation practitioners' perceptions of ITS. The 14 solutions are also published as stand-alone technical briefs.

One interesting finding of the Rural Outreach Project is that many of the local-level transportation professionals that were contacted assumed that ITS included only highly advanced technologies. It is hoped that this study will introduce local-level transportation professionals to ITS and its potential benefits, as well as show that ITS includes many levels of technology, even "Simple Solutions."

For More Information:

A full report on this study is available from the FHWA R&T Report Center, telephone number (301) 577-0818. Title: *Technology in Rural Transportation "Simple Solutions."* Publication No.: FHWA-RD-97-108. This research was conduced by Castle Rock Consultants, Eagan, Minnesota. For more information about *Enterprise*, contact Bill Legg, Washington State DOT, (206) 543-3332.

An on-line version is also available on the Internet at:

http://inform.enterprise.prog.org•

Violence in the Workplace Featured Topic at Road and Street Maintenance Schools

Pullman, Washington

Mike Magno, from the Management and Employee Benefit Department of Clover Park Technical College will speak on potentially violent situations in the workplace. Magno will speak at the Road and Street Maintenance Supervisors' School in Spokane on October 13 and in Bellevue on December 9, 1998.

The two and one-half day schools will feature talks on:

- Unpaved Road Stabilization
- Challenges of Night Work in High Volume Traffic Locations
- Rip, Rap and Barbs
- Environmental Permitting Process
- Automated Weather Stations
- Culvert Installation
- Stream Hydraulics
- Emergency/Disaster Declaration
- Slurry Seals and Microseals in Pavement
- Other topics related to road maintenance and compliance

Registration fees begin at $199 and includes over 25 speakers on road maintenance topics, a conference program, two lunches, a reception, and a banquet. Numerous indoor and outdoor vendors will participate in the schools.

To receive a brochure, call Washington State University, Conference and Institutes at 1-800-942-4978 or e-mail:

wsuconf@wsu.edu•

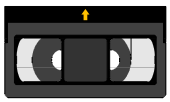
New Program for Civil Engineering Technician Degree in Transportation is Proposed

Jim McManus, P.E. TRANSPEED

The Engineering Technician has long been recognized as a key player on the team of engineering personnel designing, constructing, and maintaining the highways and other transportation facilities in this nation. Increasing complexities in the development and operation of transportation facilities and requirements for continuing quality improvement to meet higher customer expectations are all adding new challenges to the transportation engineering team. To help enhance technician level careers, opportunities for modern education, and training of the technician corps has become increasingly important. Several months ago, discussions began between WSDOT, University of Washington, and other transportation agencies in Washington to consider development of a new educational opportunity program for those individuals in or interested in career paths in Civil Engineering Technology.

Current discussions center around a two-year certification and degree program that would involve offering a combination of on-site, distance learning and other innovative approaches in engineering education. The current proposal involves an educational partnering between Shoreline Community College (North Seattle) and the University of Washington. Shoreline has an on-going Civil Engineering Technology degree program and a transportation option is being developed that would include a selection of modified TRANSPEED courses to fit into an academic degree program. There are still several details to work through, however, the goal is to launch a pilot program in January 1999. The ultimate goal will be to expand the program for statewide availability, hopefully by the 1999-2000 period.

This proposal has generated a considerable amount of interest and will be targeting those practicing or interested in careers in Civil Engineering Technology. There will be more information distributed within the next several months to various federal, state, and local agencies and the private sector companies comprising the transportation community within Washington State. Those who wish to make their interest known can call TRANSPEED, University of Washington at (206) 543-6450 or the T^2 Center at (360) 705-7390.



Walkable Communities: Designing for Pedestrians

Videotape of the class by Dan Burden. Four tapes, 5.5 hours. Available for purchase ($75) or can be borrowed by local agencies. Call T^2 Center for further information (360) 705-7386 or grayl@wsdot.wa.gov.

Free Publications From Your T^2 Center

For Washington residents only.

Name _____

Agency _____

Address _____

City and Zip _____

Phone _____

Check those items you would like to order.

____ Current Application and Successful Implementation of Local Agency Pavement Management in the United States, FHWA, 1997

____ Scrap Tire Utilization Technologies, NAPA

____ State-of-the-Art Survey of Flexible Pavement Crack Sealing Procedures in the United States, CRREL, 1992

____ Maintenance of Aggregate and Earth Roads, NWT^2 Center (1994 reprint)

____ International State-of-the-Art Colloquium on Low-Temperature Asphalt Pavement Cracking, CRREL

____ The Engineer's Pothole Repair Guide, CRREL

____ Geotextile Selection and Installation Manual for Rural Unpaved Roads, FHWA

____ Guide to Safety Features for Local Roads and Streets, FHWA, 1992

____ Family Emergency Preparedness Plan, American Red Cross, et al.

____ Getting People Walking: Municipal Strategies to Increase Pedestrian Travel, Rhys Roth, Energy Outreach Center

____ The Superpave System – New Tools for Designing and Building More Durable Asphalt Pavements, FHWA

____ A Guide to the Federal-Aid Highway Emergency Relief Program, USDOT, June 1995

____ Asphalt Seal Coats, T^2 WSDOT

____ Pothole Primer — A Public Administrative Guide, CRREL, 1989

____ Redevelopment for Livable Communities, Rhys Roth, Energy Outreach Center

____ A Guidebook for Residential Traffic Management, NWT^2 Center, 1994

____ A Guide for Student Pedestrian Safety, KJS, 1996

____ A Guide for Local Agency Pavement Managers, NWT^2 Center, 1994

____ Local Agency Pavement Management Application Guide, NWT^2 Center, 1997

____ Positive Guidance and Older Motorists — Guidelines for Maintenance Supervisors, Texas A&M

____ Planning, Design, and Maintenance of Pedestrian Facilities, FHWA, 1989

____ Traffic Calming: A Guide to Street Sharing

____ Pedestrian Facilities Guidebook, WSDOT, et. al.

Workbooks and Handouts From T2 Center Workshops

___ Handbook for Walkable Communities, by Dan Burden and Michael Wallwork

___ Geosynthetic Design and Construction Guidelines, National Highway Institute

___ Construction of Portland Cement Concrete Pavements, FHWA, 1996

___ Planning and Implementing Pedestrian Facilities in Suburban and Developing Rural Areas, TRB

___ Rockfall Hazard Mitigation Methods, FHWA, 1994

___ Part VI, Standards and Guides for Traffic Controls for Street and Highway Construction, Maintenance, Utility, and Incident Management Operations. Handbooks included: Quality Standards for Work Zone Traffic Control Devices and Flagging Handbook, FHWA, 1993

Self-Study Guides

The following noncredit self-study guides are available through WSDOT Staff Development and can be obtained from the T2 Center. An invoice will be sent with the books.

___ Technical Mathematics I, $20

___ Technical Mathematics II, $20

___ Contract Plans Reading, $25

___ Basic Surveying, $20

___ Advanced Surveying, $20

Brief (One- to ten-page) T2 Handouts

___ Asphalt Pavement Recycling, Crommes, Montague, 1993

___ Be an Effective Coach

___ Characteristics of Effective Decision Makers, Parlay 1996

___ Characteristics of a Successful Project Manager, Parlay 1996

___ Effective Communication, Parlay 1996

___ Effective Delegation, Parlay 1996

___ Eleven Tips for Time Management, Parlay 1996

___ First Steps for New Supervisors, Parlay 1996

___ Four Basic Principles of Learning, Parlay 1996

___ Four Reasons to Call a Meeting, Parlay 1996

___ Four Sources of Everyday Training, Parlay 1996

___ Get to Know Your Employees, Parlay 1996

___ Hearing Complaints, Parlay 1996

___ How to Listen to Your Employees, Parlay 1996

___ In-House Policies for Reducing Tort Liability

___ Managing Your Work Environment, Parlay 1996

___ Mitigating Road Hazards, Crommes, 1997, (Revised)

___ Operating Tips-Flagging (Updated)

___ Planning is Important, Parlay 1996

___ 20 Proven Stress Busters, Parlay 1996

___ Supervising Older Workers, Parlay 1996

___ 10 Ways to be Better Organized for Your Boss, Parlay 1996

___ The Four Ds of Paperwork, Parlay 1996

___ Tips for Reducing Tort Liability (articles from various sources), 1992

___ To Counsel or to Coach

___ Using a Gantt Chart, Parlay 1996

___ Using a PERT Diagram, Parlay 1996

___ Value Engineering, Crommes

___ Working With Your Boss, Parlay 1996

Orders may be faxed, mailed, or phoned to Laurel Gray
Phone: (360) 705-7386,
Fax: (360) 705-6858
Mailing Address: NWT2 Center,
WSDOT/TransAid, P.O. Box 47390,
Olympia, WA 98504-7390

Opportunities to Enhance Your Skills

For more information, contact the training provider listed. For additional training needs contact the Northwest T2 Center at (360) 705-7386 or 1-800-973-4496.
http://www.wsdot.wa.gov/TA/T2/T2HP.htm

Workshops

NWT2 Center, WSDOT
(360) 705-7386, Fax (360) 705-6858
http://www.wsdot.wa.gov/TA/T2/train.htm

Check our web pages for the most current and up-to-date training information. Classes are added often and is the most current source of information through the T2 Center.

T2 Scheduled Classes

Pedestrian and Bicyclist Safety and Accommodation. September 15-17, 1998.Lacey Community Center, Lacey. Instructors: Betty Drake, John Williams. The course is designed to provide training on safely integrating pedestrian and bicyclist considerations into normal highway planning, design, operations, enforcement, and education programs. Agenda: the cities that transportation built, know your customer, introduction to ADA, pedestrian and bicycle crashes, risk management, laws and ordinances, engineering/design overview, education overview, local case study, schools, citizen involvement, helmets, conspicuity, bicycle and pedestrian enforcement issues, funding. Actual case study using local area site will be presented and class will do a walk-thru. Fee: $150 locals, $300 consultants.

Cold-In-Place Recycling. September 22, 1998. Yakima Valley Museum, Yakima. Instructors: FHWA and private industry. Cold In-place Recycling (CIR) has been practiced by various methods and under a variety of names for over half a century. Thanks to cooperation between equipment manufacturers, the petrochemical industry, contractors, and government agencies, great advances have been made. Today, the process combines sophisticated engineering and testing procedures, microprocessor blending controls, specially formulated additives, and highly productive machinery to achieve both an economical and quality road surface. No Fee.

Traffic Control Software and Signalization. September 23-24, 1998. WSDOT Kent Maintenance Facility, Kent. Instructor: Raj Ghaman, FHWA. This course is designed to provide participants with skills required to evaluate the process by which signal control projects are developed, designed, implemented, maintained, and operated to promote sound practices. It addresses application of the *Manual on Uniform Traffic Control Devices* to intersection displays and also addressed are signal timing, computerized traffic signal systems, control strategies, integrated systems, and traffic control simulation and optimization software. Practical applications are emphasized. The course is divided into three parts: traffic signal design, traffic signal systems, and traffic software. Fee: $125 locals, $250 consultants.

Historic and Archeological Preservation. October 6-8, 1998. Green River Community College, Auburn. Instructor: Bruce Eberle. Learn to (1) describe the objectives of the historic and archeological legislation for preservation of worthy sites; (2) identify potential historic and archeological problems ahead of time through knowledge of what decisions must be made, when they should be made, who must make them, and what the ingredients of a sound decision are; (3) describe the procedures and the coordination with other government agencies which are required by legislation and regulations for historic and archeological preservation; (4) minimize historic and archeological problems by integrating mitigation measures into the planning and design of highway improvements in such a way as to maximize the project's benefits and minimize the detrimental effects. This class will provide instruction on the application of historic preservation procedures to locate and identify resources. It will include information on how to determine the effect of proposed highways on significant historic and archeological resources, and how to resolve the effects. Fee: $125 locals, $250 consultants.

Access Management, Location, and Design. October 27-29, 1998, Lacey Community Center, Lacey. Instructor: Ron Giguere. The course covers access management along

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streets and highways. General benefits, as well as the social, economic, political, and legal implications of access control are examined. Existing access management practices and policies from sample states and jurisdictions are used as examples of what types of programs have been initiated and how effective they have been. Through in-depth discussion, access management techniques and the warrants for their use are reviewed. Geometric standards and guidelines for design and application of these access management techniques are described in detail. Strategies for developing and implementing retrofit programs to improve existing access control are presented. Several "before" and "after" case studies show the impacts of retrofit programs on local businesses. Techniques and procedures for evaluating the impacts of access control on the safety and operations of the highway system are also covered. Fee $150 locals, $300 consultants.

Design Construction and Maintenance of Highway Safety Appurtenances and Features. December 9-10, 1998, Shoreline Center, Seattle. Instructor: Brian Bowman of Auburn University. The course covers the design, construction, or maintenance of highways. It covers the purpose and performance requirements of state-of-the-art highway safety features, such as breakaway sign supports, breakaway utility poles, traffic barriers, impact attenuators, traversable terrain and hardware features such as drainage inlets. The course also describes how features function, what can go wrong, and how to recognize and correct improper installations. Fee $80.

Self-Study Guides Available

The following noncredit self-study guides are available from WSDOT's Staff Development office and can be obtained from the T^2 Center. An invoice will be sent with books.

- Technical Mathematics I – $20
- Technical Mathematics II – $20
- Contract Plans Reading – $25
- Basic Surveying – $20
- Advanced Surveying – $20

WSDOT, Staff Development
Local Agencies should call Laurel Gray in the T^2 Center to register
(360) 705-7386

Developing Traffic Control Strategies (BQN). October 20-21, Wenatchee; October 22-23, Lacey. This course addresses the development of traffic control plans for the five primary categories of temporary traffic control zones according to work duration, as defined in the proposed Part VI of the *Manual on Uniform Traffic Control Devices* (MUTCD). The curriculum will discuss state-of-the-art traffic control and management strategies. Operational problems associated with specific strategies when applied to common activities (e.g., application of typical mobile operation on a multilane highway layout to a striping operation) will be identified along with suggested mitigation. Suggested specifications and/or special provisions to contracts for innovative strategies are also included. Fee $100.

WSDOT, Environmental Affairs Office
Contact Jim Sundahl
(360) 705-7483, Fax (360) 705-6833

Wetlands Resource and Recognition Class (BKS). October 7, Spokane. The value of wetlands as a resource, their regulation by local, state, and resource agencies, and their identification will be discussed. Mitigation and wetland policy will be discussed as well as the WSDOT processes for project development. This is a Wetlands 101 course. No fee.

National Transit Institute (NTI)
(732) 932-1700, ext. 19
Contact Susan Greenstone
http://policy.rutgers.edu/nti/PROG2.htm

NTI provides free training for public employees in the areas of federal program responsibilities in cooperation with the Federal Transit Administration (FTA). NTI also provides fee-based training throughout the country in the following areas:

- Federal Training Program
- Multimodal Transportation Planning
- Management Development
- Professional Development Curriculum for Transit Trainers and Educators, and
- Advanced Technologies and Innovative Practices

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University of Washington Professional Engineering Practice Liaison (PEPL)
(206) 543-5539, Fax (206) 543-2352
http://www.engr.washington.edu/~uw-epp/Epp/upsc.html

Fundamentals/Engineer-In-Training Refresher Course. September 14-October 21

Civil Engineering Refresher Course. September 15, October 20

Effective Writing for Technical Professionals. September 15, 17, 22, 24, and 29 (five sessions)

Developing HTML Help. September 17-18

Designing and Implementing Stream Habitat Modifications for Salmon and Trout. October 20-22

Stormwater Treatment: Chemical, Biological and Engineering Principles. October 27-28

Geology and Geomorphology of Stream Channels. November 4-5

Hydrologic Modeling and Design of Retention/Detention Facilities. November 18-20

Wetlands Ecology, Protection and Restoration. December 15-16

TRANSPEED, University of Washington
Call Julie Smith
(206) 543-5539, Fax (206) 543-2352
http://www.engr.washington.edu/~uw-epp/Transpeed/index.html

Prices shown are for public employees/others. Contact UW for more details.

Fundamentals of Traffic Engineering - Module II. October 1-2, Shoreline Center, Seattle. $150/300

Roadway Culvert Hydraulic Design. October 15-16, St. Martin's College, Lacey. $150/300

Advanced Highway Capacity Analysis for Engineers and Planners. November 4-6, Heathman Lodge, Vancouver. $180/350 plus $95 lab fee.

Fundamentals of Traffic Engineering - Module III. November 5-6, Shoreline Center, Seattle. $150/300.

Public Works Construction Project Management. November 9-10, UW, Seattle. $150/300 plus $30 lab fee.

Construction Inspection of Public Works Projects. November 12-13, UW, Seattle. $150/300.

Legal Liability for Transportation Professionals. November 16-17, Shoreline Center, Seattle. $150/300

Roadway Value Engineering. December 1-3, Gonzaga University, Spokane. $180/350.

1999 Schedule of Classes

Stormwater Engineering for Transportation Professionals January, Seattle.

Public Works Construction Project Management January 11-12, Vancouver.

Construction Inspection of Public Works Projects. January 14-15, Vancouver.

Managing Project Delivery. January 19-21, Seattle. March 2-4, Vancouver.

Legal Liability for Transportation Professionals. January, Seattle.

Manual of Uniform Traffic Control Devices. February, Lacey.

Roadway Value Engineering. February, Lacey.

Traffic Calming: Techniques and Management. February, Seattle.

Roadway Geometric Design. February, Lacey.

Inspection of Existing Culverts. March, Lacey. March, Spokane.

American Society of Civil Engineers
1-800-548-2723
http://www.asce.org/confconted/conted.html

The ASCE offers seminars on such subjects as construction, geotechnical, transportation, management, environmental, structural, and hydraulics and water resources. CEUs can be earned by attending. Various seminars are held in Seattle and Portland. The ASCE also offers self-study videotapes, audiotapes, and software some of which earn CEU credits.

Wetlands and 404 Permitting. September 28, Portland.

American Public Works Association (APWA)
(816) 472-6100, ext. 3534
Contact Shirley Calandra

APWA provides satellite video conferences where large audiences share concrete ideas and practical information. The following video conference is the last one scheduled for 1998.

- October 21, Using Asset Management Systems to Protect Your Investment

Contact APWA for details.

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Washington State Department of Personnel (DOP)
(360) 586-2720
http://www.wa.gov/dop/edtp/pages/contents.htm

The following is a partial list of classes available to local governmental agencies based on space availability. Many computer classes are available but too numerous to list. Contact DOP for their latest catalog.

Achieving Extraordinary Customer Relations - $200.
Tacoma. September 17-18, March 10-11.
Olympia: October 7-8, November 4-5, January 13-14, April 14-15, May 12-13.

Bi-Polar Seminar - $160.
Olympia. September 14-15, October 19-20, November 19-20.

Budgeting for the Non-Financial Manager - $80.
Olympia. September 10-11, December 3-4, March 11-12, June 17-18.

Cardiopulmonary Resuscitation - No Fee.
Olympia. October 28, January 27, April 13.

Customer/Employee Surveying - $80.
Olympia: September 10-11, May 6-7.
Seattle. February 2-3.

Customer Service - $75.
Olympia. October 22.
Spokane. October 19.

Editing for Clear Writing - $75.
Olympia. October 19-20, March 18-19, June 21-22.

Effective Meeting Management - $75.
Olympia. October 20, January 26, April 15, May 19, June 7.
Tacoma. September 16.

Entry Management Development Core Program - Phase I - No Fee.
Olympia: September 15-18, October 20-23, November 3-6, December 7-10, January 5-8, February 2-5, February 16-19, March 9-12, April 20-23, May 11-14, June 21-24.
Seattle: October 27-30, May 3-6,
Spokane: September 28-October 1, April 6-9.
Tacoma: August 3-6, December 2-5, June 14-17.
Yakima: November 16-19.

Entry Management Development Core Program - Phase II - $95.
Olympia: October 21-23, December 14-16, February 24-26, May 19-21.
Tacoma: March 16-18.

Facilitator Skills Training - $175.
Olympia: October 14-16, January 19-21, March 17-19, May 5-7.

Facilitator Skills Training, Advanced - $120.
Olympia: November 12-13, February 11-12, April 8-9, June 10-11.

First Aid Basic (One Day) - $25.
Olympia: October 21, December 16, February 17, April 14, June 9.

First Aid, Basic (2 Days) - $35.
Olympia: November 5-6, January 11-12, March 8-9, May 3-4, June 14-15.

Internet - Introduction - $99.
Tacoma: September 16; October 1, 21, November 13, December 10, January 8, 22, February 19, March 5, 19, April 2, 20, May 10, 18, June 25.

Internet: Basics for Government (One Day) - $99.
Olympia: September 18, October 12, November 3, 24, December 17, January 11, February 2, 24, March 18, April 9, May 4, 28, June 14.

Internet: Basics for Government (4 hours) - $60.
Spokane: October 6.
Olympia: October 12, November 2, 24, December 17, January 11, February 2, 24, March 18, April 9, May 4, 28, June 14.

Implementing the Employee Development Performance Plan - $50.
Spokane: September 16.
Yakima: September 17.
Olympia: September 14, October 1, 22, November 24, 30, December 3, 10.

Leadership Skills That Work - $35.
Olympia: September 18, January 15, June 2.
Seattle: December 18.
Tacoma: December 21.

Managing Job Stress - $100.
Olympia: September 17-18, November 5-6, January 11-12, February 25-26, April 8-9, May 17-18, June 10-11.

Project Management - $95.
Olympia: September 29-30.
Seattle: April 13-14.

Planning Your Future - $125.
Olympia: September 14-15, February 22-23, April 12-13.

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Presentation Skills - $105.
Olympia: October 12-14,
January 6-8, March 24-26, June 7-9.

Presentation Skills, Advanced - $95.
Olympia: November 2-3,
March 11-12, April 29-30.

Sexual Harassment Awareness and Prevention - $80.
Olympia: October 22, December 2, March 3, May 5.

Sexual Harassment Awareness and Prevention - $40.
Olympia: October 22, 8:00-12:00.

Success Habits - $75.
Olympia: October 12, November 2, December 10, February 18, April 8, May 20, June 17.

Technical Writing - $165.
Olympia: October 5-7, March 8-10.

Time Management - $75.
Olympia: October 13.

Writing Skills - No Fee.
Olympia: September 14-16, November 2-4, January 11-13, 20-22, February 1-3, March 22-24, April 14-16, 19-21, May 12-14, 24-26, June 7-9, 23-25.
Seattle: October 5-7.
Spokane: March 29-31.

Evergreen Safety Council
401 Pontius Avenue North
Seattle, WA 98109 (206) 382-4090
1-800-521-0778
http://www.esc.org/ecourse.html

Some of the technical courses available are as follows:

- Initial Safety and Health Training/Orientation
- Accident Investigation
- Recordkeeping and Reporting
- Safety Committees
- Fire Extinguisher
- Fire Prevention/Emergency Action
- HAZCOM/Chemical Safety
- HAZWOPER (8, 24, & 40-hr.)
- Personal Protective Equipment (PPE)
- Lockout/Tagout/Electrical Safety
- Machine Guarding and Safety
- Assured Equipment Grounding
- Hearing Protection/ Conservation
- Respirator
- Confined Space
- Ergonomics
- Fall Protection
- First Aid and CPR

Train-the-Trainer Courses can be taught in all the above topics.

Washington State Department of Labor and Industries (L&I)
(360) 902-5590, Fax (360) 902-5459
http://www.wa.gov/lni/workcomp/employer.htm

L&I conducts a number of no-fee workshops around the state including the following subjects:

- Accident Investigation
- Accident Prevention
- Bloodborne Pathogens
- Confined Spaces
- Controlling Your Claim Costs
- Excavation and Trenching
- Fall Protection
- Hazard Communications
- Introduction to Ergonomics and the Voluntary Ergonomic Guidelines
- Lead in Construction
- Office Ergonomics
- Personal Protective Equipment

Resource Partners, Inc.
600 University Street, Suite 3431
Seattle, WA 98101
Contact John Thomas
(206) 223-1023, Fax (206) 223-5549

Resource Partners provides training in the following areas:

- Business and Accounting
- Computer Courses
- Employment Law
- Human Resources
- Safety and Equipment

For training catalog information contact the agency directly.

Computer Programs

The following computer programs may be downloaded from the Internet at *http://www.wsdot.wa.gov/TA/T2/computer.htm*

Design Cost Estimate. A software database program that calculates cost projections based on standard items.

Materials Approval Tracking. A software program designed to track materials data, need, status, and approval of any materials sampling and documentation needed for approval.

HyperCalc. A shareware utility for converting between metric and English units.

Force Account Macros. A series of ready-made Excel spreadsheets and macros to save you time on daily force account calculations and reports, including wage and equipment rates.

APWA CAD Symbol Standards and Menus. A public domain program of standard AutoCAD symbols developed by the Washington Chapter of APWA for use with AutoCAD release 12.

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PaveSmart. A software program for implementing a pavement management system based in the WSDOT Pavement Management System.

Microsoft Access Runtime Program. Assists in running the Materials Approval Tracking and Design Cost Estimate Program.

UTEC System. A software program consisting of a main menu designed to provide a record base for identifying street locations within an agency.

Conferences and Meetings

http://www.wsdot.wa.gov/TA/T2/conf.htm

Transportation Planning for Small and Medium-Sized Communities. September 16-18, Spokane.

Society of Engineering Science 35th Annual Technical Meeting (SES98) September 27-30, Pullman. Information: WSU Conferences and Institutes (509) 335-3530, 1-800-942-4978, fax (509) 335-0945, e-mail wsuconf@wsu.edu.

International Utility Suppliers Exposition. October 8-9, Portland Metropolitan Exposition Center, Portland, Oregon. For professionals working in the utility or public works market. See and handle the latest in equipment and tools that allow you to do your job more effectively and cost-efficiently. Displays, demonstrations, and learning seminars. Phone (503) 570-8637, or fax (503) 682-2017 for information.

36th Road and Street Maintenance School — East. October 13-15, Spokane. Information: WSU Conferences and Institutes (509) 335-3530, 1-800-942-4978, fax (509) 335-0945, e-mail wsuconf@wsu.edu.

International Conference on Accelerated Pavement Testing. October 18-20, 1999, Reno Nevada. First announcement and call for papers. Information: Maria Ardila-Coulson, Director, Nevada T^2 Center/257, University of Nevada, Reno, NV 98557, Phone (702) 784-1433, fax (702) 784-1429, e-mail maria@unr.edu.

Northwest Pavement Management Association Fall Conference. "Networking Results into Actions," October 26-29, Doubletree Hotel - Columbia River, Portland. Information: Judy Elliott, city of Vancouver (360) 696-8290, ext. 8388, fax (360) 696-8588, e-mail jelliott@ci.vancouver.wa.us.

Society for Ecological Restoration Northwest Chapter Conference. "Ecosystem Restoration: Turning the Tide," October 28-30, Tacoma Sheraton Hotel, Tacoma. Information: WSU Conferences and Institutes (509) 335-3530, 1-800-942-4978, fax (509) 335-0945, e-mail wsuconf@wsu.edu.

APWA Fall Conference (American Public Works Association). November 3-6, 1998, Wenatchee.

Sixth Annual United States Hot Mix Asphalt Conference. November 4-6, Portland Hilton, Portland, Oregon. Registration Fee $150 per person. Information: 1-888-468-6499, fax (301) 731-4621. NAPA, NAPA Building, 5100 Forbes Blvd., Lanham, MD 20706-4413.

WSAC Legislative Conference (Washington State Association of Counties). November 10-12, Yakima.

36th Road and Street Maintenance School — West. December 9-11, Bellevue. Information: WSU Conferences and Institutes (509) 335-3530, 1-800-942-4978, fax (509) 335-0945, e-mail wsuconf@wsu.edu.

Four Hot New Videos to Get You Through a Long Cold Winter

The T2 Center has recently purchased new videos on a variety of topics, some related to winter operations and safety. If you would like to check them out for viewing, please contact Laurel Gray at (360) 705-7386 or e-mail GrayL@wsdot.wa.gov. Watch for the new and updated version of the audio visual catalog to be mailed in September with over two dozen new video titles.

No. 366 Snow and Ice Control (WSDOT)

Part 1: Prepare for Snow and Ice — 12 Minutes. Discusses planning for snow and ice control in a very good manner at the worker and supervisor level.

Part 2: Checking the Equipment — 14 Minutes. Discusses overall and in-depth required equipment checks in preparation for snow and ice control.

Part 3: Plowing and Sanding — 20 Minutes. Discusses overall and in-depth the required equipment adjustments and techniques used during snow and ice control plowing and sanding.

No. 367 Defensive Driving — A Crash Course

16 Minutes, Coastal Training Technologies, Corp.

This tape presents how to be a better, safer driver by driving defensively, recognizing hazards, and staying alert. A good refresher that covers most situations of driving vehicles.

No. 373 H-Series Motor Grader — Operator Techniques

30 Minutes, Caterpillar, Inc.

This video shows and explains complete operating techniques, with the operator in mind, of a modern articulated motor grader under actual working conditions.

No. 376 H-Series Motor Grader-Snow Removal

21 Minutes, Caterpillar, Inc.

This video shows and explains operator techniques during snow removal application, from the operator point of view, of modern articulated motor graders under actual snow removal working conditions.

Northwest Technology Transfer Center
WSDOT-TransAid Service Center
P.O. Box 47390
Olympia, WA 98504-7390

Address Correction Requested

A newsletter of the Local Technical Assistance Program (LTAP)

T2 Bulletin

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The Local Technical Assistance Program (LTAP) is a national program financed by the Federal Highway Administration (FHWA) and individual state transportation departments. Administered through Technology Transfer (T2) Centers in each state, LTAP bridges the gap between research and practice by translating state-of-the-art technology into practical application for use by local agency transportation personnel.

Any opinions, findings, conclusions, or recommendations presented in this newsletter are those of the authors and do not necessarily reflect the views of WSDOT or FHWA. All references to proprietary items in this publication are not endorsements of any company or product.

Washington State Department of Transportation
TransAid Service Center

U. S. Department of Transportation
Federal Highway Administration